Appendix 10

Marine Conservation Programs

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Marine Endangered and Threatened Species

The following marine species are listed as endangered or threatened in Maine. Click on a species to display a two-page fact sheet for that species.

Reptiles and Amphibians

Loggerhead - *Caretta caretta*	**Federally Threatened**
Leatherback - *Dermochelys coriacea*	**Federally Endangered**
Atlantic Ridley - *Lepidochelys kempi*	**Federally Endangered**

Mammals

Northern Right Whale - *Eubalaena glacialis*	**Federally Endangered**
Humpback Whale - *Megaptera novaeangliae*	**Federally Endangered**
Finback Whale - *Balaenoptera physalus*	**Federally Endangered**
Sperm Whale - *Physeter catodon*	**Federally Endangered**
Sei Whale - *Balaenoptera borealis*	**Federally Endangered**

Fish

Atlantic Salmon - *Salmo salar*	**Federally Endangered**
Shortnose Sturgeon - *Acipenser brevirostrum*	**Federally Endangered**

Federally Endangered Species in Marine Waters
(and Minke Whale)

Maine Department of Marine Resources
Section 6 Application Appendix

North Atlantic Right Whale (*Eubalaena glacialis)*

Description: North Atlantic right whales are the world's rarest cetacean, with estimates of between 300 and 325 individuals in existence today. Right whales are large, rotund, slow-swimming whales that inhabit shallow, coastal waters along the East Coast of the United States and Canada. Due to their slow speed, large size, high blubber content (thus floating when dead), and propensity to inhabit coastal waters, right whales were considered the "right" whales for 19th century whalers to hunt. Easily distinguishable from other whales, right whales lack a dorsal fin, have a V-shaped spout or blow, and have callosities (wart like structures) near their eyes, blowhole, lower jaw, and rostrum. These callosities, unique to each individual, allow researchers to identify different animals. Adult right whales, mostly black with white on their bellies, grow from 44-55 feet and weigh between 45 and 55 tons, with females being larger than males. Their flippers, broad and up to five feet long, are located just below and behind the eyes. They have a large head (about 1/3 total body length), paired nostrils, and a curved mouth containing gray baleen with fine bristles. Between 200 and 270 baleen plates are rooted in a right whale's upper jaw, and can be up to seven feet long.

Whaling: Right whale populations in the both North Atlantic and North Pacific were nearly extirpated by commercial whaling. European whaling began with the Basques in the 11th century in the Bay of Biscay, then spread to Labrador by 1530 and to New England by the 1600s. In the North Pacific, intense whaling began in the Gulf of Alaska in 1835; by 1900 the North Pacific right whale population was extremely depleted. Soviet whaling further reduced the eastern population during the 1960s to its present numbers of approximately 100 animals. Right whales were hunted primarily for their oil and baleen. Whale oil, extracted from the blubber, was primarily used as an illuminant and to a lesser extent for the tanning of leather and the manufacture of candles, soap, and lard substitutes. Baleen was used to make fashionable women's clothes, whips, and canes.

Range and Habitat: Right whales occur in the North Atlantic and North Pacific in extremely low numbers. The North Pacific right whale (*Eubalaena japonica*) population is thought to contain only a few hundred animals at best. In the North Atlantic, right whales have historically been sighted from Iceland to Florida. However, after the end of commercial whaling, their range became limited to five primary areas along the East Coast of the United States and Canada. These areas include the Bay of Fundy Conservation Area (Canada), Scotian Shelf Conservation Area (Canada), Cape Cod Bay critical habitat, Great South Channel critical habitat, and the critical habitat established off the coast of southern Georgia and northern Florida. In the U.S., critical habitat designations can be made pursuant to the Endangered Species Act for federally listed endangered species.

Ecology: Right whales occur singly, in pairs, or in small groups of three to eight in feeding areas. Occasionally groups of up to 30 whales are seen. New England waters represent a major feeding and nursery area. In March and April, right whales congregate in the plankton-rich waters in Cape Cod Bay and off Georges Bank in the Gulf of Maine.

During the summer and fall, the whales spend their time in the Bay of Fundy and the southeastern coast of Nova Scotia feeding and demonstrating courtship behaviors (August and September). During the winter months, a portion of the population, mainly females and juveniles, migrates to the calving grounds in the shallow waters between Savannah, Georgia and Cape Canaveral, Florida. Most adult males do not travel to the calving grounds. Calving peaks between December and March after a gestation period of approximately twelve months. Calves average 15 feet in length at birth and nurse for at least nine months. Females give birth every three to five years. Males and females reach sexual maturity at a body length of approximately 45 feet, and at an age between seven and ten years. Although right whales do produce extensive and complex sounds under water, they do not produce “songs” as humpback whale males do, nor do they use these sounds in echolocation as toothed whales do.

Right whales skim feed both at the surface and underwater by swimming with their mouths open. They swim through dense aggregations of copepods (small crustaceans about the size of a grain of rice) and occasionally krill (shrimp-like animals), and filter water through their baleen. The tiny critters remain inside the whales’ mouths and are swallowed whole.

Threats: Because North Atlantic right whales are slow moving, spend considerable time at the surface, and inhabit inshore areas, current threats include collisions with ships and entanglements in fishing gear. Collisions with vessels have killed at least 13 right whales since 1976. There were 16 recorded encounters between right whales and fishing gear from 1975-1989 and 57% of photographed whales exhibit scars or injuries indicating interactions with lines and/or nets. Marine ecosystem changes induced by global warming and pollution may affect food availability. Recreational whale watching may occasionally cause harassment, but this is believed to be insignificant. Due to the extremely small population size, any mortality is considered significant and may limit population recovery.

Conservation and Management: The North Atlantic right whale population is estimated to contain approximately 300 individuals. Since 1937, the species has had nearly complete protection but numbers continue to decline. In 1970 right whales were listed as endangered under the Endangered Species Act (ESA). Additional protection from illegal take and harassment is afforded through the Marine Mammal Protection Act (MMPA), which covers all marine mammals in the U.S. In Maine, right whales were state-listed as endangered until 1997. At that time, the Legislature removed them from the list, along with other listed marine species. However, in late 2003 Maine Department of Marine Resources petitioned the State Legislature to relist Federally endangered and threatened marine species. This was achieved in 2004.

Right whales are carefully monitored annually along the East Coast through both aerial and boat-based surveys, and a photographic catalog has been established by the New England Aquarium to identify and track individuals. Right whales were the subject of intense public debate in the late 1990s, when the National Marine Fisheries Service (NMFS) was sued to designate critical habitat for right whales and to institute protective measures that had the potential to close some inshore fisheries. In response, NMFS designated three critical habitat areas: two feeding grounds (Cape Cod Bay and Great South Channel) and one calving ground (coastal waters off Georgia and Florida). In 1996, the Atlantic Large Whale Take Reduction Team was established to develop a Take Reduction Plan to reduce serious injury and mortality to large whales (finback,

right, humpback, and minke) from accidental entanglements in fishing gear in the North Atlantic. The plan, published in February 1999, implements specific gear closures, as well as gear modifications to try to reduce interactions between fishing gear and large whales.

Rorqual Whales

The following four whale species (humpback, finback, sei, and minke) are rorquals: whales that have ventral, or throat, pleats extending from the chin toward the navel. These pleats allow a whale's throat to expand while feeding, as a whale engulfs water and food.

Humpback Whale (*Megaptera novaeangliae)*

Description: Humpback whales are relatively common in the Gulf of Maine and are frequently observed by whale watchers. Humpbacks are large, black whales that readily show their flukes when diving, thus making them excellent animals to identify and study. They have wart-like sensory knobs called tubercles on their head and lower jaw. Like right whales, they have paired blowholes, and their blow or spout is bushy and can reach about ten feet in height. Dorsal fins vary among individuals and are located far back on the body on a hump. Humpbacks have long, narrow flippers (1/4 to 1/3 of total body length) with knobs on the anterior margin and which are usually all white, though the dorsal surface may be spotted with black. Baleen plates, rooted in the upper jaw, are all or mostly black and number between 270 and 400 on each side of the mouth. Ventral pleats, numbering between 14 and 22, extend from the tip of the lower jaw to the belly. The flukes are all black above and have a highly variable black and white pattern below (from all black to all white), allowing researchers to identify individual animals as they dive. Barnacles can be found on the chin, anterior portion of the ventral pleats, anterior edges of the flippers, and edges of the flukes. Humpbacks range in length from 52 to 56 feet and weigh approximately 40 tons. Females are larger than males.

Range and Habitat: Humpback whales live in all oceans, but are uncommon in arctic regions. During the summer months, they migrate to higher latitudes to feed. In the North Atlantic, populations occur in the Gulf of Maine, Nova Scotia, Newfoundland and Labrador, and Greenland. Humpbacks primarily inhabit the waters over the continental shelf.

Ecology: Humpback whales migrate to feeding areas in northern latitudes in the summer, and return to warm, tropical waters to winter and breed. On their northward migration, they pass through New England waters in April and May. Some animals remain in the Gulf of Maine for the summer, where they feed primarily on krill, herring, sand lance, and other small fish. Other humpbacks continue north, reach Labrador by July, and remain there until September. On their southward migration, they pass again through New England waters from October to December. Humpbacks can be observed singly, in pairs, or in groups of twelve or more. When preparing for a deep dive, they expose a greater portion of their back, curve their body, and display the flukes at an angle perpendicular to the water's surface. These acrobatic whales are often seen breaching (leaping out of the water), lobtailing (standing on their head and slapping their tail on the water), and waving and splashing their flippers on the water. Vocalizations include loud whistles and wheezing sounds, which may be used for communication. During the breeding season, males produce complex "songs" presumably to attract

females or even to display dominance over other males. Humpbacks reach sexual maturity at about nine years, when males are 33 feet long and females are 36 feet. Breeding mainly takes place during the winter months in low latitudes in the shallow waters of the Caribbean Sea. Calving occurs at two-year intervals, but some females produce a calf every year. The gestation period lasts 11-12 months and the calf is weaned at 5-6 months of age or when it reaches approximately 25 feet in length. Humpbacks may live to be 50 years old.

Humpback whales feed by lunging into schools of prey. Many populations use bubble "nets" or clouds of bubbles to concentrate and trap prey. Humpbacks engulf huge amounts of water and prey, which expands their ventral pleats. They then use their enormous tongues to filter the water out through their baleen, while the prey gets swallowed whole.

Threats: Humpback whales were easy targets for whalers because they inhabit waters close to shore, and are slow swimmers. Based on whaling records, 28,000 humpbacks were killed between 1905 and 1965. Today, entanglement in fishing gear occurs frequently in the Gulf of Maine. Studies show that 48-65% of the animals in this region bears entanglement scars, and four to six entanglements are documented annually. Additional threats include ship strikes, disturbance from underwater acoustics, commercial whale watching and research boats, and habitat degradation. Commercial fishing may compete with whales directly for some species (herring), or may remove predators, like mackerel, of sand lance, which is a preferred food item for humpbacks.

Conservation and Management: Humpback whales are among the most endangered of the large whales. In 1955, the International Whaling Commission banned the commercial whaling of humpbacks in the North Atlantic and in 1965 banned the hunt for humpbacks worldwide. Today humpbacks are listed as endangered on the ESA and are also protected under the MMPA. Populations are believed to be slowly increasing; about 8,000 individuals remain in the western North Atlantic. Worldwide population estimates stand between 15-20,000, which is equal to 15-20% of original population estimates. Human-caused injury and mortality are believed to be frequent enough to be limiting the rate of recovery. Humpback whales were listed as endangered in Maine until 1997, when the Legislature removed the animal from the state list. However, in late 2003 Maine Department of Marine Resources petitioned the State Legislature to relist Federally endangered and threatened marine species. This was achieved in 2004.

Finback Whale *(Balaenoptera physalus)*

Description: Finback whales (also referred to as "fin" whales) are second in size only to blue whales. Finbacks are long (up to 78 feet), sleek, and streamlined rorqual whales that have 50 to 100 ventral pleats. Finbacks demonstrate an unusual characteristic in which the lower jaw is asymmetrically colored whitish on the right side and mottled black on the left. Otherwise, the body is light gray to brownish-black on the back and sides, and the underside of the body, flippers, and flukes is white. A pale chevron originates behind the blowholes and slants toward the flukes to form a broad "V" shape across the back. On the right side of the head, most finbacks have swirls (called the "blaze"). Researchers distinguish individual animals using the chevron, blaze, and dorsal fin, which is quite prominent and located far back on the body. Finbacks have paired blowholes and a distinctive, robust spout that rises 20 feet into the air. Prior to a dive, they arch their back and show their dorsal fin but rarely lift their flukes above the water.

Fin whales may have between 260 and 480 baleen plates on each side of the mouth. Baleen is normally black or olive green, except for the first third of the baleen on the right side, which is white. Females are slightly larger than males and both sexes weigh between 50 and 70 tons. Finbacks can be distinguished from blue whales by their smaller size, unique coloration, longer, narrower head, and taller dorsal fin. They are also among the quickest of the large whales, achieving speeds of up to 25 knots. Sei whales are smaller and more slender than finbacks, have a uniformly colored dark gray to black body, and relatively tall, erect, falcate dorsal fin.

Range and Habitat: Finbacks live in all oceans in coastal and offshore waters. They are most commonly found 25 miles or more from shore. Since finbacks have complex seasonal movements and inhabit a broad latitudinal range, migration may not occur in this species. However, some studies indicate that some populations may shift in the winter to occupy the summer habitats of others. North Atlantic finbacks are most abundant between Long Island and Labrador and are typically observed in 50-100 fathom areas over the continental shelf. New England waters represent a major feeding area for this stock. Some individuals over-winter near Cape Cod; however, peak abundance in the Gulf of Maine occurs from April through October.

Ecology: Finback whales are the most common whale species in the Gulf of Maine. They travel singly or in groups of 3 to 7 animals or more during certain times such as feeding. In the Gulf of Maine, finbacks feed on herring, capelin, squid, and krill. They have been observed circling schools of fish at high speed, rolling on their right side, and engulfing the dense school of fish. The white right jaw may aid in capturing prey. Finbacks can dive as deep as 755 feet in search of food and can consume up to two tons of food a day. As with other rorquals, finbacks engulf large volumes of food and water, expanding the ventral pleats, then contracting them to let the water out, trapping their prey in the baleen. These whales become sexually mature between five and ten years of age, when they attain a length of 55-60 feet. Breeding occurs during the winter and gestation lasts about 12 months. Calves weigh about two tons at birth and are weaned at six to eight months of age, at a length of 35-40 feet. Females usually have a calf every two to three years. Finbacks can live to be at least 80 years old.

Threats: Given their speed and preference for the open sea, finbacks were almost completely protected from early whalers. With the modernization of fast boats and harpoon guns, and the depletion of the larger blue whales from commercial whaling, finback whales fell victim to 20th century whalers. In the Southern Hemisphere alone, 725,000 finbacks were killed. Like other large whales, today finbacks are faced with entanglement in fishing gear and collisions with ships. Marine ecosystem changes induced by global warming and pollution may affect food availability. Recreational whale watching may occasionally cause harassment, but this is believed to be insignificant. Despite these threats, populations continue to grow.

Conservation and Management: After the slaughter of 40,000 whales annually for decades, the International Whaling Commission (IWC) lowered whaling quotas for finback whales in the mid-1970s, then reduced them to zero in 1985. In 2000, the IWC estimated a population of 2,200 finbacks between Virginia and the Gulf of St. Lawrence, and several thousand likely exist off eastern Canada. With an ‘endangered’ listing on the ESA in 1970, finback populations off eastern North America are believed to be increasing. Finback whales were listed as endangered in Maine until 1997, when the Legislature removed them from the list. However, in late 2003 Maine Department of

Marine Resources petitioned the State Legislature to relist Federally endangered and threatened marine species. This was achieved in 2004.

Sei Whale (*Balaenoptera borealis)*

Description: Sei whales (pronounced “say”) are smaller than finbacks but larger than minke whales. Sei whales can reach 60 feet and weigh 30 tons, with females slightly larger than males. Sei whales have a high, columnar blow or spout, which can extend 6-8 feet. Sei whales can be distinguished from finbacks in that sei whales have a larger, more erect dorsal fin; dark undersides of the flippers and tail flukes; lack of asymmetrical coloration and dorsal chevron; and a bluish gray body color with whitish spots, most likely caused by cookie-cutter shark bites. Sei whales, being rorquals, have 30 to 60 ventral pleats extending well forward of the belly and 300 to 410 baleen plates on each side of the mouth.

Range and Habitat: Sei whales are found in all oceans. In the North Atlantic they range from Iceland to the Venezuela coast but are seen infrequently in U.S. waters. Episodic incursions into the Gulf of Maine occur rarely, and may be followed by years or decades of no sightings. These whales breed and feed in open waters, and are frequently observed in temperate waters in the summer and subtropical waters in the winter. Two stocks have tentatively been identified in the North Atlantic. One occurs in the Labrador Sea in June and migrates northward later in the summer along the coasts of Labrador, West Greenland, and possibly Iceland. The other occurs off the continental slope of the U.S. during the winter and migrates northward by mid-June to Georges Bank, the Northeast Channel, and Browns Bank.

Ecology: Sei whales are usually seen alone or in pairs, but sometimes thousands may gather if food is abundant. Like the northern right whale, they are “skimmers”, feeding near the water surface using their baleen to filter squid, copepods, euphausiids, and amphipods from the water column. Sei whales are also “gulpers” like humpback whales, and feed on krill and small schooling fish by engulfing one mouthful of prey and water at a time. Sei whales are probably the fastest cetaceans, capable of swimming up to 25 knots for short distances. These whales erratically change swimming direction, making the species easy to identify for whalers. Sei whales are shallow divers and only remain submerged for five to ten minutes. Both sexes become sexually mature at about eight to ten years of age, which corresponds to a length of 36 feet for males and 40 feet for females. Breeding occurs between November and March, with a peak in January, and breeding intervals are generally two to three years. Gestation lasts between eleven and twelve months and calves are weaned at six to eight months old, when they reach 24-27 feet in length. These whales may live as long as 74 years.

Threats: The hunting of sei whales in the North Atlantic began in the 1800s. A whaling station at Blandford, Nova Scotia killed hundreds of sei whales in the 1900s, and 200,000 were killed worldwide during this time period, particularly in Antarctica. In 1972, stocks were estimated to be only 21% of original numbers, and in the early 1980s as few as 2,200 to 2,300 individuals were estimated in U.S. Atlantic waters. Today, sei whales are at risk of collisions with ships. Marine ecosystem changes induced by global warming and pollution may be affecting food availability. Populations in the North Atlantic and North Pacific are believed to be reasonably abundant today, despite these threats.

Conservation and Management: As a result of protection received through the IWC, ESA, and MMPA, commercial hunting is no longer a problem for sei whales. Cetacean experts believe that sei whale populations are increasing, but data are sparse. Given their pelagic ecology, there have been no reported fishery-related injuries or mortalities. Sei whales were listed as endangered in the state of Maine until 1997, when the Legislature removed these animals from the state list. However, in late 2003 Maine Department of Marine Resources petitioned the State Legislature to relist Federally endangered and threatened marine species. This was achieved in 2004.

Minke Whale (*Balaenoptera acutorostrata*)

Description: Minke whales are the smallest of the rorquals. Males can grow to a length of 32 ft. and females to 36 ft. At sea, minkes can be confused with fin whales but they differ in many ways. Minkes are much smaller, lack the asymmetrical coloration pigmentation on the lower jaw, lack a distinctive blow or spout, and have a distinctly different dive sequence from fin whales. Minke whales have a narrow, pointed snout with a slender, streamlined body, which is dark grey to black on the back and lightening to white on the belly and undersides of the flippers. There are often areas of light gray on their flanks, one just above and behind the flippers and the other behind the head. Individuals in the Northern hemisphere have a diagonal white band on the upper surface of each flipper, commonly called “minke mittens.” Their heads are triangular, with a single sharp longitudinal ridge along the top and forward of the blowhole. Minkes have twin blowholes, typical of all baleen whales. Short baleen plates (230 to 360) are found on each side of the upper jaw. The breathing sequence consists of 5-8 blows at intervals of less than a minute, followed by a deep dive that can last up to 20 minutes. Minkes normally take only 1 or 2 breaths between dives when travelling. The dorsal fin always appears with the blow and the tailstock is arched high into the air before sounding, but the flukes are never shown unless the animal breaches.

Range and Habitat: Minke whales can be found virtually worldwide, but are less common in the tropics than in cooler waters. Minkes often enter estuaries, bays, and inlets and during the summer may feed around headlands and small islands. Most migrate seasonally from polar feeding grounds to warm temperate to tropical breeding grounds, although there appear to be some groups resident year-round. Three geographically isolated populations occur, in the North Pacific, the North Atlantic, and the Southern Hemisphere.

Ecology: Minke whales are generally attracted to ships and often approach moving vessels. They are fast swimmers that can keep pace with a ship travelling at 24-30 knots per hour. Minkes may suddenly appear alongside a vessel without warning but are unlikely to bow-ride. Minkes observed breaching usually leave the water at a 45° angle and re-enter without twisting or turning their bodies. Most of the body may leave the water with the initial surge and the entire dorsal fin is often visible. The back can be arched, allowing for a clean dolphin-like re-entry, or held straight causing a tremendous splash as it lands on its stomach.

Conservation and Management: Since minkes are the smallest of the seven great whales, their size made them uneconomical to harvest commercially while the larger whales were abundant. This species was afforded protection with the declaration of the moratorium on whaling by the International Whaling Commission in 1986. Norway and

Japan argue for the harvesting of minkes in small numbers on a regular basis, as the species is abundant and is not listed as endangered or threatened.

Although not federally listed, minke whales, common in Maine waters and protected under the Marine Mammal Protection Act, are a primary concern of the State of Maine, and a letter was sent to NMFS in 2001 seeking State authorization to manage all entanglement and recovery efforts for minke whales within Maine State waters. Authorization was granted that same year.

Sperm Whale (*Physeter catodon (*or *macrocephalus))*

Description: Sperm whales were immortalized in Herman Melville's epic *Moby Dick*. These distinctive cetaceans are the largest of the toothed whales and are easily identified by their large, blunt, barrel-shaped heads that comprise about one third of the total body length for adult males and one fourth for adult females. Their narrow lower jaws contain 40-50 conical teeth that fit into sockets in the upper jaw. A single blowhole (characteristic of toothed whales) is located on the left front end of the head. The spout projects forward and to the left at a 45-degree angle, unlike that of any other whale. There are two to ten short, deep grooves on the throat. The dorsal fin is thick and has a low profile, forming a compressed hump. Behind the dorsal fin a series of bumps extend down the spine toward the flukes, and the skin on the back has a wrinkled appearance. The flippers, short and broad, are located a short distance below and behind the eyes. The large, triangular flukes are deeply notched. Sperm whales are dark gray but may appear brown in the sunlight, with white around the mouth and white patches on the belly and flanks. Adult males are larger than females by about one-third (males to 60 feet, females to more than 36 feet) and weigh twice as much (up to 54 tons for males and 25 tons for females).

Range and Habitat: Sperm whales are found in all oceans except the Arctic. In the North Atlantic, they are found from Nova Scotia to the Gulf of Mexico but are rarely observed in the Gulf of Maine. They prefer deep waters and generally stay along the edge of the continental shelf in water 500 to 1,000 fathoms deep. Males travel alone or in groups, and can be found in higher latitudes feeding during the summer and lower latitudes during the winter. Females, calves, and juveniles travel much less and remain in temperate and tropical waters year round.

Ecology: Sperm whales feed primarily on large and medium-sized squid, although octopuses, sharks, skates, and other fishes are also taken. Their search for squid accounts for much of their biology, behavior, and annual and seasonal movements. Each day, an adult male eats about 3.5 percent of its body weight. Many animals bear scars from encounters with giant squid. Sperm whales feed in areas of upwelling, such as the edges of the continental shelf, where food is plentiful. They can dive to depths of 3,000 feet and can remain underwater for periods lasting from 20 minutes to over an hour. Like other toothed whales, they use sonar to detect and locate prey. A sperm whale's head contains a large reservoir of waxy liquid called spermaceti, which may be used as a buoyancy regulator. They are social animals and may occur in groups of 1,000 or more individuals. Males form harems during the breeding season in a polygamous mating system. In the Northern Hemisphere, mating occurs from January to July, and peaks from March through May. The gestation period lasts 16-17 months, the longest of all whale species. In the Atlantic, calving occurs from May to November near

the Azores. Females nurse their calves for at least two years and will not conceive again for another four to six years. Sperm whales may live to be 60-70 years old.

Threats: For nearly two centuries, sperm whales were the staple of the New England whaling industry. During this time, over one million animals were killed, hunted for their spermaceti, ambergris (a waxy substance in their digestive tracts), and oil. The head of a sperm whale contains three to four tons of spermaceti, which was used as a lubricant for machinery, as well as for the manufacture of ointments and smokeless candles. Whale oil was once used as a fuel for lamps, and also as a lubricant and the base for skin creams and cosmetics. Today the major threats to sperm whales are entanglements in fishing gear and collisions with ships. Other threats include ocean pollution and the ingestion of plastics.

Conservation and Management: Current population trends for sperm whales are unknown. However, current population estimates in the Atlantic are 20-100,000 animals and they have been listed on the ESA since 1970. Sperm whales were listed as endangered in Maine until 1997, when the Legislature removed the animals from the state list. However, in late 2003 Maine Department of Marine Resources petitioned the State Legislature to relist Federally endangered and threatened marine species. This was achieved in 2004.

Atlantic (Kemp's) Ridley Turtle (*Lepidochelys kempii)*

Description: The Kemp's or Atlantic ridley turtle is the smallest marine turtle, averaging 20-28 inches in length. Adults have an almost circular or slightly heart-shaped grayish-green carapace (top shell), which is typically wider than long and serrated along the rear margin. The plastron (bottom shell) is white, while the head and limbs are gray. Males are distinguished from females by a long, prehensile tail; a thick, curved claw on each forelimb; and a concave plastron. Females have a shorter tail that barely extends past the edge of the carapace; lack recurved claws on the forelimbs; and have a flat, ridged plastron. Atlantic ridleys have a parrot-like beak for feeding and paddle-like limbs for swimming.

Range and Habitat: Adult ridleys are primarily restricted to the warm waters of the Gulf of Mexico and are rarely reported in the cold Gulf of Maine waters. Immature animals inhabit the Gulf of Mexico north to Long Island Sound, New England, and Nova Scotia. In the late summer and fall, juveniles are frequently seen south of Cape Cod. Venturing north of Cape Cod often leads to cold-stunning events, especially in the fall. Atlantic ridleys feed on the bottom of shallow, coastal and estuarine areas (typically less than 150 feet deep) and juveniles may use mats of floating *Sargassum* (sea grass) for refuge and foraging.

Ecology: Atlantic ridleys become sexually mature between 7 and 15 years. Most nesting occurs from April to August along one beach on Mexico's northeastern coast, near Rancho Nuevo. Courtship and mating occurs offshore in close proximity to the nesting beaches, and females return to shore to nest every one to two years. Females nest in groups, which once numbered in the thousands, and lay one to four clutches with 20-28 days in between each clutch. These clutches can be separated by more than five miles between nesting sites. Nests are excavated in fine sand, either on the beach itself or on the dunes, which can be up to 180 feet from the water. Clutch size varies from 100-110 eggs, and incubation lasts 45-60 days. Following nesting, adults migrate to their principal

feeding areas in the Gulf of Mexico, where they remain until the next nesting cycle. Juveniles travel as far north as the New England coast. Prey items include crabs, shrimp, sea urchins, snails, bivalves, cephalopods, jellyfish, fish, marine plants, and algae.

Threats: The decline of Atlantic ridleys is attributed to the heavy harvest of eggs; killing of adults for meat and other products; and the high level of incidental take by shrimp trawlers. In Mexico, continued threats include degradation of beach habitat through development and population growth, dredging and channelization projects, oil spills, and entanglement in and ingestion of marine debris.

Conservation and Management: The Atlantic ridley is one of the most endangered sea turtles and in 1970 was federally listed on the ESA throughout its entire range. Populations have declined since 1947, when an estimated 42,000 females nested in a single day. A current population estimate totals 1,500 to 3,000 individuals. Slight population increases are attributed to strict protection of individuals and nesting sites as well as the use of turtle excluder devices (TEDs) in shrimp trawls in the U.S. and Mexico. Recovery programs include captive rearing of juveniles, and the establishment of a second nesting colony at Padre Island, Texas. Given the rarity of this sea turtle in Maine, little can be done here to effectively contribute to the recovery of Atlantic ridleys. Entanglement in fishing gear and mortality from trawlers may take some turtles in the Gulf of Maine each year. Due to their endangered status on the federal ESA, Atlantic ridley and leatherback sea turtles were state-listed as endangered in Maine from 1986-1997. However, in 1996 the Maine Legislature changed the State's Endangered Species Act to no longer automatically list federally listed species. As a result, these species were removed from the Maine Endangered Species List in 1997. However, in late 2003 Maine Department of Marine Resources petitioned the State Legislature to relist Federally endangered and threatened marine species. This was achieved in 2004.

Loggerhead Turtle (*Caretta caretta*)

Description: The loggerhead turtle is the largest living hard-shelled turtle, exceeded in length and weight only by the leatherback. Adults are typically 2 - 3 feet in carapace length and weigh about 300 pounds. The carapace (top shell) is reddish brown and may be tinged with olive, and the edges of the scutes may be yellow. The plastron (bottom shell) is yellow and hingeless, with two longitudinal ridges that disappear with age. The head varies in color from reddish or yellow chestnut to olive brown, and the many scales on the top and sides of the head have yellow borders. The skin on their limbs and tail is dark above and yellowish along the borders and below. Males are distinguished from females with wider shells that taper toward the rear, long, thick tails, a large recurved claw on each forelimb, and more yellow pigmentation on the head.

Range and Habitat: Loggerheads are widely distributed through most of the world's warm oceans. In the western Atlantic they range as far north as Newfoundland in the summer, although sightings along the Maine coast and in the Gulf of Maine are rare. Loggerhead distribution varies widely according to life stage. Hatchling turtles use driftlines of *Sargassum* for refuge and food in the open ocean. Subadults move into shallow coastal regions and adults spend their time in subtropical continental shelf waters, bays, lagoons, and estuaries. Along the northern limits of their range, loggerheads may become cold-stunned and die from hypothermia.

Ecology: Loggerheads reach sexual maturity between 10 and 30 years and may reproduce for 30 years. Primary nesting areas in the U.S. occur along the East Coast of Florida, with additional sites in the Carolinas and Georgia. In Atlantic waters, peak nesting months are May through July, although nesting may occur from January to September. Adults travel long distances from feeding areas to nesting beaches. Females typically return to nest at 1-7 year intervals at the same beach over her lifetime. She may lay up to 9 clutches a season in 11 - 15 day intervals. Nests are constructed on beaches above the high-tide line typically within 4 or 5 hours of sunset. The female excavates a nest chamber using her flippers and deposits 45 - 200 soft, leathery eggs, which incubate for 49 - 76 days. Hatchlings emerge at night and crawl across the beach to the sea. Loggerhead prey items include sponges, jellyfish, squid, shrimp, amphipods, sea urchins, and fish. Loggerhead behavior depends on water temperature. At temperatures of 13 - 15ºC they become lethargic, at 10ºC they adopt a stunned floating posture, and at colder temperatures they may hibernate. When cool they bask on the water surface and when overheated they seek out cooler waters. They may live to be 62 years of age.

Threats: Loggerhead turtle population decline can be attributed to increased mortality in shrimp trawls, coastal development, disturbance of nesting females, pollution and marine litter, and nest predation.

Conservation Needs: Loggerhead populations are declining worldwide, but are still the most abundant species in U. S. coastal waters. About 50,000 - 70,000 nesting females are estimated in the southeastern U. S. The species was federally listed as threatened in 1978. Estimated annual mortality of 5,000 - 15,000 turtles (primarily juveniles) accrue from drowning in shrimp nets. From 1986 - 1997, the loggerhead was state-listed as endangered in Maine because of their federal listing status. However, in 1996, the Maine Legislature changed the Maine Endangered Species Act to discontinue the automatic state listing of federally listed species. However, this species was overlooked and remained on the state endangered species list while all others were removed in 1997. In late 2003, Maine Department of Marine Resources petitioned the State Legislature to relist federally Endangered and Threatened marine species. This was achieved in 2004.

Leatherback Turtle (*Dermochelys coriacea*)

Description: The leatherback turtle is the world's largest living marine turtle. Adults reach 11 feet in length and weigh between 650 and 1,500 pounds. Leatherbacks have a smooth shell covered with rubber-like skin lacking the scutes, or hard bony plates, which are characteristic of most other turtle species. Seven prominent keels run the length of the carapace (top shell), which is teardrop-shaped and tapers to a point at the tail. The shell is dark brown to black and is covered with small white to yellowish blotches. The head and neck are black or dark brown with a few white, yellow, or pink blotches. Limbs are paddle-like with black and white spotting, and the front flippers are proportionately longer than those of any other sea turtle. Males have concave plastrons (bottom shell), a more tapered carapace, and tails that are longer than their hind limbs, whereas females have extensive pink blotches on their head and a tail that is half the length of a male's.

Range and Habitat: Leatherbacks are found in all the world's oceans except the Antarctic. In the Atlantic, they range from the Gulf of Mexico and the Caribbean Sea to Newfoundland and Labrador and across to Norway and the British Isles. They are the most frequent marine turtle encountered in the Gulf of Maine and are commonly

observed in most years. Leatherbacks are pelagic unless nesting on tropical and subtropical beaches.

Ecology: Leatherbacks are unique among reptiles in that they have the ability to regulate their body temperature and keep it warmer than the surrounding water. Adaptations include a countercurrent heat system, a thick insulating layer of oil-saturated fat under the skin, and a large body mass that can retain heat. These adaptations allow individuals to range as far north as the Labrador coast in the summer. Because of these and other distinctive features, leatherbacks were separated from other turtle species and placed in a unique taxonomic family (*Dermochelyidae*). Females reach sexual maturity at about 4 ft. carapace length; for males, size at maturity is unknown. Nesting locations are scattered through the Gulf of Mexico, Caribbean, and the southeast United States. The largest nesting assemblages are found in the U. S. Virgin Islands, Puerto Rico, and Florida. Small numbers of leatherbacks have been reported nesting in Texas and Georgia. Female leatherbacks may nest at 2 - 3 year intervals, and emerge from the sea around midnight to excavate a nest chamber into which they deposit 80 - 90 eggs. Incubation lasts 60 - 65 days, and hatchlings emerge after dark. A female may lay 6 clutches a season at 8 - 12 day intervals. Leatherbacks prefer to feed on jellyfish, comb jellies, salps, and other related animals. Their mouth, throat, and esophagus are lined with numerous spines to aid in the swallowing of their slippery prey. Leatherbacks follow the migration of jellyfish, their primary food source, along the Gulf Stream and into the Gulf of Maine in late summer, then return to southern waters of the Gulf of Mexico and along the Florida coast by winter. In some years they can be locally common south of Long Island and in central and eastern portions of the Gulf of Maine. Since the leatherback's preferred food is the arctic jellyfish, the outer Gulf of Maine is an important feeding area. Leatherbacks are pelagic, but occasionally enter shallow waters in bays and estuaries and typically occur west of the Gulf Stream at water depths of less than 200 feet. They dive almost continuously to depths of up to several thousand feet.

Threats: Leatherback declines are attributed to tremendous over-harvest of eggs, killing adults, and incidental takes by shrimp trawlers. Leatherbacks become entangled in longlines, fish traps, buoy anchor lines, and other ropes and cables. Entanglement in fishing gear and mortality from trawlers likely occurs in the Gulf of Maine each year and usually results in drowning. Leatherbacks eat a wide variety of marine debris, especially plastic bags and Styrofoam pieces, balloons, and plastic pellets. They are also vulnerable to boat collisions and are at risk when encountering oil spills. Degradation of beach habitat, dredging and channelization projects also cause mortality.

Conservation and Management: Leatherback turtle populations are declining rapidly. The worldwide population may be only 20,000-30,000 nesting females. Only a few hundred nest in the southeastern U. S. The leatherback was federally listed as endangered in 1970. Strict protection of individuals and nests and the use of turtle excluder devices (TEDs) in shrimp trawls have contributed recently to slight population increases. From 1986 to 1997, the leatherback was state-listed as endangered in Maine because of their federal listing status. However, in 1996, the Maine Legislature changed the Maine Endangered Species Act and discontinued the automatic state listing of federally listed species. As a result, this species were removed from the Maine Endangered Species List in 1997. However, in late 2003 Maine Department of Marine Resources petitioned the State Legislature to relist federally Endangered and Threatened marine species. This was achieved in 2004.

COOPERATIVE MANAGEMENT PLAN FOR LARGE WHALES AND SEA TURTLES IN THE STATE OF MAINE

(The Maine Recovery Plan)

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COOPERATIVE MANAGEMENT PLAN FOR LARGE WHALES AND SEA TURTLES IN THE STATE OF MAINE

INTRODUCTION

There are at least 22 species of marine mammals and turtles that are known to frequent the waters of the northern Gulf of Maine. Among these are multiple species of special concern, including five species of Federally endangered large whales (North Atlantic right, humpback, finback, sei, sperm) and three species of Federally listed turtles (Kemp's ridleys and leatherbacks are endangered, and loggerheads are threatened). (See Appendix for full list of species of concern.) The North Atlantic right whale, with a population estimated at about 320, is considered one of the most endangered of the large whales. For decades, since the end of commercial whaling, the right whale has shown little recovery. The lack of right whale recovery has been linked to collisions with ships, entanglement in specific fishing gear, habitat degradation, and disturbance from vessels.

In 1996, the National Marine Fisheries Service (NMFS) convened the Atlantic Large Whale Take Reduction Team (ALWTRT) to prepare a Plan that would reduce incidental takes of humpback, fin and right whales listed as endangered species under the Endangered Species Act (ESA). Also included in the Plan are minke whales, which are protected under the Marine Mammal Protection Act (MMPA) but are not listed on the ESA. The Atlantic Large Whale Take Reduction Plan (ALWTRP) was prepared in accordance with MMPA provisions that require NMFS to reduce serious injury and mortality of marine mammals from commercial fishing operations. NMFS is responsible for the development and implementation of a Take Reduction Plan for strategic stocks that interact with Category I and II fisheries, which cause frequent or occasional mortality and/or injury of marine mammals.

The Maine gillnet and lobster fisheries are identified as Category I fisheries on the List of Fisheries under the MMPA, and are documented as causing serious injury and mortality of the endangered North Atlantic right whale. Consequently the Maine Department of Marine Resources (DMR), in collaboration with the Maine commercial fishing industries, developed a Cooperative Management Plan for Large Whales and Sea Turtles in the State of Maine (Recovery Plan) to reduce the risk posed by these fisheries to right whales and other protected resources. DMR's knowledge of State of Maine licensed fishermen and of the lobster and gillnet fisheries within its waters is integral to successful large whale take reduction. The State of Maine is fully committed to the protection of Atlantic large whales and sea turtles, while at the same time protecting the economic and operational realities of the State's fisheries. The Maine Recovery Plan acknowledges the variability in spatial distribution between whales and fishing gear off the Maine coast, and recognizes that every situation that involves both the fisheries and marine mammals is different and unique.

RECOVERY PLAN BACKGROUND

DMR sought initial program funding and authority from NMFS to disentangle minke whales in 2001. Preliminary funding was a combination of a Northeast Consortium (NEC) and Federal protected resource contracts. Upon receipt of NEC funding in July 2001, DMR hired a State Take Reduction Coordinator who remains responsible for the implementation of the Recovery Plan. The Coordinator serves as a liaison between DMR, Maine's lobster associations, Maine's Lobster Zone Management Councils and a wide range of other regional program collaborators.

Under the Recovery Plan protocols, DMR manages the surveillance and monitoring of movements of all whales observed to be in an area where there is State of Maine fishing gear in waters out to 35 miles offshore. This regional approach allows DMR and Maine commercial fishermen to effectively monitor the position of whales for the entire duration that whales are in Maine fishing areas. DMR is responsible for all State and lobster industry communications, and has established a toll-free reporting hotline for fishermen and other whale sightings reporters.

DMR coordinates a network of trained Maine Marine Patrol (MMP) and industry standby assistance for any immediate support required for potential whale and turtle disentanglement efforts. In event of an entanglement, members are alerted and quickly moved to the area. Marine Patrol Officers (MPO) are involved with every reported entanglement.

DMR coordinates a collaborative gear modification research and development program utilizing a contracted Remote Operated Vehicle (ROV) to document experimental efforts. In addition, DMR is in the process of accumulating baseline data on the State's lobster fishery's effort by season, geographic area and gear configurations. This information will be used to help determine future efforts to reduce the risk posed by endlines in the northern Gulf of Maine.

Further collaboration with a number of public and private entities that have ongoing marine mammal conservation and education programs (including the University of Maine, University of New England, College of the Atlantic and non-government organizations), solidify the credibility of the Plan The Maine Recovery Plan was developed from the State's recognition that there is a need to enhance the survival and recovery of marine mammals and sea turtles in Maine waters, thereby contributing to their global recovery, while at the same time protecting the economic and operational realities of our State's commercial fisheries.

RECOVERY PLAN OBJECTIVES

The Maine Recovery Plan is multi-phase with short and long-term goals, and will be accomplished through these three objectives:

- Protect, manage and enhance marine mammal and sea turtle populations by assessing population status and trends as well as life history needs of these species using Maine waters;
- Identify and coordinate existing roles, responsibilities, and activities of the various involved parties, and promote improved coordination among them; and
- Improve and promote public education and participation.

RECOVERY PLAN COLLABORATORS

Federal: National Marine Fisheries Service, United States Coast Guard, United States Navy
State: Department of Marine Resources, Marine Patrol, Department of Transportation Department of Environmental Protection, Inland Fisheries and Wildlife
Industry: Maine Lobstermen's Association, Down East Lobstermen's Association, Southern Maine Lobstermen's Association, Maine Gillnetters Association, Grand Manan Fishermen's Association, East Coast Tuna Association
Conservation: New England Aquarium, Center for Coastal Studies, Chewonki Foundation, Humane Society of United States, Ocean Conservancy
Academic: University of Maine, College of the Atlantic, Bigelow Laboratories, University of New England
Strandings: New England Aquarium, University of New England, Marine Animal Lifeline, Allied Whale
Others: Cruise Maine Coalition, Maine Pilots Association, Whale Watches, Harbor Masters

2004-2005 RECOVERY PLAN GOALS

- Secure continued funding for Maine Recovery Plan programs including gear modification research and development, Northern Gulf of Maine Foraging Survey and poly rope buyback/exchange
- Continue and further develop Phase I and II including maintenance of the current sightings and disentanglement networks, ongoing "low-profile" groundline research, development and experimentation efforts, and industry/community outreach programs (see appendix)
- Seek additional Level 4 training for Marine Patrol and trained industry disentanglement network members
- Establish State coordinated Strandings program incorporating existing State strandings organizations into the Recovery Plan
- Collaborate with NOAA and establish State floater and strandings protocols
- Collaborate with Northeast Fisheries Science Center and other academics to develop and undertake a comprehensive Northern GOM foraging survey
- Initiate implementation of plankton tows into Recovery Plan protocols
- Expand existing GIS sightings program to include Stellwagen Bank survey data
- Investigate the use of Distributed Oceanographic Data System (DODS) in State GIS early warning system
- Fully incorporate turtle disentanglement in Recovery Plan protocols
- Encourage and seek funding for ghost gear removal
- Encourage and facilitate Canadian collaboration with Disentanglement and Sightings Networks

RECOVERY PLAN COMPONENTS

Sightings Network

The Maine Large Whale Sightings Website is an interactive GIS/ web-based application that enables commercial fishermen and other interested groups to access real-time sightings information of large whales in the Gulf of Maine. Sightings are received from a variety of sources (including NOAA aerial and shipboard surveys, ferry operators, commercial fishermen, recreational boaters, whale watches and the Maine Marine Patrol), reported via email, fax or the Maine Whale Hotline, a toll-free number from anywhere in New England. When a sighting is received from a reliable and confirmed source, the coordinates and sighting information are entered into a GIS mapping system and are immediately viewable to the general public through an Internet Map Server (IMS) interface on the Maine Whale Plan's sightings page. Associated information linked to the sighting point and available to the viewer includes the species of whale, source, date and time of sighting, and other relevant observations (whether the whale is feeding, traveling, etc.). The website allows archived sightings to be displayed as a layer, and viewers can manipulate the program to depict contemporary sightings by time period to show trends.

The primary limitation of the effectiveness of the current web page is the availability of sightings reports. Aerial and shipboard surveys completed by NOAA provide the majority of sightings information. Although outreach efforts have been made to many other groups capable of providing sightings information, such as whale watch tours, commercial fishermen, and deep-sea charter boats, sightings reported from these groups are sporadic and voluntary. NOAA aerial surveys fly specific patterns that do not always cover coastal Maine. Therefore, an increased number of sightings from other sources are needed to provide a more realistic picture of large whale presence in State and near shore waters. DMR has been collaborating with NOAA staff at the Stellwagen Bank National Marine Sanctuary and the Northeast Fisheries Science Center to incorporate additional data into the current host site. It is anticipated that, as the program continues to develop, this outreach will generate a broader participation.

The Recovery Plan's sightings page is capable of providing much more information than it does currently, however, expansion is dependent upon additional funding. The usefulness of the site could be greatly enhanced by including additional map "layers" displaying shipping lanes, plankton concentrations and temporally closed areas. The area of sightings coverage could be expanded to include a greater range of New England coastline. While adding shipping lanes to the display would be relatively simple, adding plankton data would be complex and thus costly. There is great potential for the sightings page -- as a tool for fishermen and mariners, a resource for scientists, and as an informational service for the general public.

Disentanglement Network

There are currently over three hundred Maine Lobstermen who have received Level 1 disentanglement training. Forty-four of these lobstermen and all of the State's MPOs (52) have been trained in disentanglement to at least Level 2 including whale behavior and identification, preliminary entanglement response and assessment training. Four MPO boat Captains have received advanced Center for Coastal Studies (CCS) training,

which included the technique for satellite tagging of an entangled whale and video case studies.

Level 1 and 2 training has been conducted by disentanglement experts from CCS, New England Aquarium and College of the Atlantic, and Level 2 involved a hands-on component unique to the Maine Recovery Plan – the use of a life-size whale model. This model whale greatly enhances the trainings and allows participants to practice disentanglement techniques. Special disentanglement tools, based on those created for CCS, were built for use by the MMP and the advanced trained lobstermen. All Marine Patrol vessels and eleven Level 2 trained lobstermen have been issued either full or "mini" disentanglement kits. The ongoing training and tools have allowed DMR to provide full disentanglement coverage along the entire Maine coastline.

Authority to disentangle minke whales was received by the State in 2001, and permission to disentangle other large whales is obtained on a case-by-case basis through direct consultation with NOAA and CCS. In September of 2003, the Maine Disentanglement Team successfully disentangled a minke whale following protocols established by NOAA incorporated into the Recovery Plan.

Gear Modification Research and Development

DMR fully recognizes that disentanglement is a stop-gap measure, and that preventive gear modification efforts are necessary to reduce the threat of entanglement to large whales in Maine waters. Although there is a high compliance (97%) by Maine fishermen with the current ALWTRP gear modification requirements, many fishermen have become interested in the development of operationally viable gear modifications to prevent entanglement. Spurred by this industry interest and by the continued aversion to Dynamic Area Management (DAM) actions in productive fishing grounds, DMR has spearheaded a coast-wide effort to inform and solicit input from lobstermen regarding risk-free gear modification profiles.

In early 2003, the Department initiated a preliminary survey of lobster trap groundlines using a remote operated vehicle (ROV). This survey provided groundwork information on various coastal habitats and groundline configurations, and clearly demonstrated the profile arcs that result from using floating groundline. The summary video was shown at lobster zone council meetings and the Maine Fishermen's Forum, surprising a number of fishermen with the profile demonstrated by some poly groundlines. Many lobstermen who were involved with the filming or who had seen the footage expressed an interest in developing modifications that would result in a lower profile. With help and encouragement from DMR, two fishermen from mid-coast Maine received NMFS funding to develop and test groundline gear modification ideas.

In the fall of 2003, DMR continued gear modification research efforts with a comprehensive statewide groundline survey, greatly expanding the scope of the earlier ROV survey. Working with a contracted ROV operator (and from a different lobster boat every day), DMR filmed gear out of two dozen harbors along the entire coast. Over 200 camera drops were made, and lobster gear was successfully filmed on most of them. This effort yielded a comprehensive summary of baseline data regarding which rope-types were used in which areas; the bottom-types of each area; the average profile of each type of rope; and how different configurations of gear affected the profile of the groundline.

In March 2004, DMR worked with area lobstermen on a mini-experiment to rig twenty pairs of traps with configurations that showed promise of demonstrating a low profile, including various mixes of sinking and floating rope, float rope with leadline tucked into it, and less-buoyant float rope newly developed for DMR by a rope manufacturer. These traps were set out by a collaborating fisherman, and filmed by DMR divers holding a drop camera. Results were recorded on tape and then transcribed into drawings showing the relative arc heights, providing additional data for further refinement of the next gear modification project.

The third ROV survey, in June 2004, focused on rope configurations that, based on results of the preliminary surveys, were determined to present a relatively low groundline profile; and also on the experimental rope that was newly developed at the request DMR to display that property. This survey was specific to the western part of the state (near Jeffreys Ledge and potential DAM closures) and the Downeast coast (with its extreme rocky and tidal habitats). Lobstermen in these areas would be greatly challenged by potential new regulations that stipulated a universal elimination of floating groundlines.

The June 2004 survey demonstrated two things very clearly – that the nature of the bottom along much of the Maine coast requires very strong rope with some flotation in order to prevent gear loss; and that shortening up the length of floating rope between traps greatly reduces the overall profile of the arc.

FUTURE PROGRAMS

Sightings and Reporting Network

The Maine State Whale Sightings Hotline was established in 2002 to receive reports of whale sightings from around the State and region. Multiple upgrades have been made to the system. DMR plans to enhance the current GIS web page through ongoing collaborations with NOAA and the Northeast Fisheries Science Center to incorporate additional sightings information as well as relevant data from any future surveys. In addition, within the implementation of the new State coordinated strandings program, DMR proposes to host a single centralized point of contact for all Maine marine mammal and turtle strandings reports. Proper response will be triaged from the initial call. This service, in addition to live whale sightings, will greatly increase the capacity of the existing hotline. DMR, in collaboration with NOAA and the existing strandings group, will increase public outreach in order to expand the number and coverage of sightings and strandings reports.

Disentanglement Network

The minke whale is currently the only species that the Maine disentanglement network is authorized to address without the direct involvement of NOAA and CCS. DMR plans to maintain the existing disentanglement network and will continue the annual training of its members. However, with the exception of right whale disentanglements, a logical outgrowth of the Recovery Plan is increased responsibility and authority for other large whale and turtle disentanglements. Further advanced training is needed. Although CCS has committed to providing hands-on training to the MMP during any advanced disentanglement efforts in Massachusetts and Maine, this training has been difficult to arrange and only four MMP boat captains have received any advanced training.

Gear Research and Development

DMR plans to build upon ongoing experimental gear modification efforts in the continued development, testing and implementation of low-profile groundlines. Crucial to this effort is determining the definition of “low profile” in Maine coastal waters and the near shore waters. DMR will continue to collaborate with NOAA and the ALWTRT with this effort. DMR is also accumulating baseline information concerning the configuration, geographic placement and seasonality of Maine lobster gear. A University of Maine graduate student intern, contracted by DMR, has recently conducted a survey of Maine lobstermen to gather relevant data. The results of this survey will create a baseline understanding of endline distribution in Maine waters, and together with the results of a foraging survey will help DMR determine and propose to NOAA and the ALWTRT appropriate risk reduction measures for endlines in Maine waters.

Strandings Program

Since the establishment of the Maine Whale Hotline, DMR has received a number of reports of both cetacean and pinniped strandings. In order to further develop the Maine Recovery Plan, DMR proposes to establish a State coordinated strandings program incorporating the existing State strandings organizations into the Recovery Plan. This centralized approach will allow for an increased collaboration within the existing strandings network in Maine, and will lead to a streamlined communication system to facilitate prompt response to strandings of cetaceans, pinnipeds and marine turtles along the entire Maine coastline. DMR will host and coordinate a centralized Statewide call center and will dispatch reports to the appropriate member of the Maine strandings network. DMR will also help develop and coordinate the network’s volunteer corps to ensure that the entire coastline is covered for all reports of cetacean, pinniped and sea turtle issues.

Foraging Survey

Although DMR has amassed baseline data on the rocky and tidal habitats that the Maine lobster industry uses for much of its harvesting, it is unknown if and how the right whale and other large whales are using these same areas. There is currently no information available about the presence of *Calanus (*the right whale’s main food source) along the coast of Maine, and furthermore it is unknown whether the whales feed along the bottom in rocky areas. An evaluation of the presence of *Calanus* in Maine waters is critical to the determination of effective future gear modification efforts. DMR is collaborating with the Northeast Fisheries Science Center to assemble qualified plankton and whale scientists in order to develop and conduct a northern Gulf of Maine foraging survey. DMR believes that this information is critical to determine whether and how right whales feed on Maine’s rocky and tidal habitat.

Dedicated DMR Protected Species Bureau

DMR is carefully considering the development of a dedicated Protected Species Bureau. The purpose of this Bureau will be to coordinate and lead the State’s efforts to fully develop and implement the Recovery Plan. However, adequate and long term funding is required to allow for this expansion. The initial phases of the Maine Recovery Plan have positioned the State as an important player in the effort to reduce injury and mortality to large whales and have permitted the development of multiple well-developed

programs. As the Maine Recovery Plan programs become more expansive – involving strandings response, plankton research, habitat assessment, disentanglement, sightings networks, fishing gear modification solutions -- DMR's ability to create a Protected Species Division will greatly enhance Maine's current protected resource management efforts.

National Marine Fisheries Service – Proactive Conservation Program: Species of Concern in the Northeast Region (Maine through Virginia)

http://www.nero.noaa.gov/prot_res/SOC%20Final%20report-web.pdf

Management of Fisheries in the Gulf of Maine

Of the more than 2000 known species in the Gulf of Maine, approximately 50 species are harvested at some level, either commercially, recreationally, or both. Depending on a number of factors, including the geographic distribution of the species, the primary management responsibility may fall at the state, interstate, or federal level. The State of Maine, the Atlantic States Marine Fisheries Commission (ASMFC), the New England Fisheries Management Council (NEFMC), and the National Marine Fisheries Service (NMFS) are all involved in the management of species in the Gulf of Maine.

The State of Maine is responsible for management of its marine fisheries from the high water mark out to three nautical miles. Management responsibilities are shared between the state legislature, the Department of Marine Resources (DMR), and the Department of Marine Resources Advisory Council. The legislature directs development of state policy, and through the Joint Standing Committee on Marine Resources, oversees legislation regarding the conservation and development of marine resources.

The legislature has delegated specific regulatory authorities to the DMR. The DMR may adopt fishery management plans and regulations for conservation purposes by limiting time, method, number, weight, length, or location of harvested species. However, these authorities may be limited to the extent that the legislature has established management measures by statute. In these instances, the Department may be enjoined from action in the prescribed area. In the face of unusual damage or imminent depletion, the DMR may adopt emergency regulations for the purpose of resource protection. The DMR also has the authority to adopt regulations to address gear conflict problems, and it may do so in emergency if immediate action is necessary to prevent serious economic dislocation.

Regulations proposed by the Commissioner, with the exception of those promulgated under emergency provisions and certain matters related to lobster management, must receive the advice and consent of the Department of Marine Resources Advisory Council. The Council is comprised of 15 multi-industry representatives appointed by the Governor, and subject to legislative confirmation. The Council responds only to proposals from the Commissioner, and may not initiate rule-making.

The ASMFC was formed in 1942 by fifteen Atlantic coast states from Maine to Florida to assist in managing and conserving their shared coastal fishery resources. The Commission was founded on the principle that coastal fishery resources are best managed cooperatively because of their migratory life cycles and the interstate nature of the industries they support. In 1993, Congress enacted the Atlantic Coastal Fisheries Cooperative Management Act, which directs the Commission to adopt fishery management plans for coastal fisheries and establishes a firm obligation on the part of State’s to implement the Commission’s plans. The Commission is required to continuously review state implementation and report its results to the Secretaries of Commerce and Interior.

The NEFMC is responsible for the development of federal management plans that address management needs beyond the state’s three-mile territorial limit. The Commissioner of Marine Resources and Maine industry representatives, participate on the NEFMC. NMFS is responsible for implementing the plans developed by the NEFMC and other regional councils. In addition, the NMFS develops management plans for high

seas species such as tuna and protects marine mammals under the federal Marine Mammal Protection Act.

The following is intended to be as comprehensive as possible list of all species for which management measures are in place. The “Managed Species” group is intended to be those species for which actual management plans are in place. The second group generally has a more limited amount of regulation.

Managed Species

Alewife *Alosa pseudoharengus* (ME statutes and regulations)
American eel/elver *Anguilla rostrata* (ASMFC Interstate Fishery Management Plan for American eel; ME regulations)
American lobster *Homarus americanus* (ME statutes and regulations; ASMFC Interstate Fishery Management Plan for American lobster)
Atlantic herring *Clupea harengus* (NEFMC Herring Management Plan; ASMFC Interstate Fishery Management Plan for Atlantic herring, ME statutes and regulations)
Atlantic salmon* *Salmo salar* (Atlantic salmon Conservation Plan; ME statutes)
Blue mussel *Mytilus edulis* (ME statutes and regulations)
Green sea urchin *Strongylocentrotus droehbachiensis* (ME statutes and regulations)
Groundfish (NEFMC Multispecies Management Plan and ME regulations)
- American plaice *Hippoglossoides platessoides*
- Atlantic cod *Gadus morhua*
- Atlantic halibut *Hippoglossus hippoglossus*
- Haddock *Melanogrammus aeglefinis*
- Ocean pout *Zoarces americanus*
- Pollock *Pollachius virens*
- Redfish *Sebastes marinus*
- White hake *Urophycis tenuis*
- Windowpane flounder *Scophthalmus aquosus*
- Winter flounder *Pseudopleuronectes americanus* (ASMFC Interstate Fishery Management Plan for Winter flounder)
- Witch flounder *Glyptocephalus cynoglossus*
- Yellowtail flounder *Limanda ferruginea*

Mahogany quahog *Mercenaria mercenaria* (MAFMC Surf clam and Ocean quahog Fishery Management Plan; ME regulations)
Monkfish *Lophius americanus* (NEFMC Monkfish Management Plan; ME regulations)
Northern shrimp *Pandalus borealis* (ASMFC Interstate Fishery Management Plan for Northern shrimp; ME regulations)
Red hake *Urophycis chuss* (NEFMC Small Mesh Multispecies Management Plan; ME regulations)
Scallop *Placopecten magellanicus* (NEFMC Scallop Management Plan; ME statute and regulations)
Skate (NEFMC Northeast Skate Complex Management Plan)
- Winter skate *Raja ocellata*
- Barndoor skate *Raja laevis*
- Thorny skate *Amblyraja radiata*
- Smooth skate *Raja senta*
- Little skate *Raja erinacea*
- Clearnose skate *Raja eglanteria*
- Rosette skate *Raja garmani*

Silver hake *Merluccius Bilinearis* (whiting) (NEFMC Small Mesh Multispecies Management Plan; ME regulations)
Soft-shell clams *Mya arenaria* (ME statutes and regulations, municipal ordinances)
Spiny dogfish *Squalus acanthias* (NEFMC Dogfish Management Plan; ASMFC Interstate Fishery Management Plan for Spiny dogfish and coastal sharks)
Striped bass** *Morone saxatilus* (ASMFC Interstate Fishery Management Plan for Striped bass)
Summer flounder *Paralichthys dentatus* (ASMFC Interstate Fishery Management Plan for Summer flounder, scup and Black sea bass)
Wolffish *Anarhichas spp.* (ME regulations)

Limited Management

American shad *Alosa sapidissima* (ASMFC Interstate Fishery Management Plan for American shad; ME regulations and statutes)
American smelt *Osmerus mordax* (ME regulations)
Atlantic mackerel *Scomber scombrus*
Atlantic menhaden *Brevoortia tyrannus* (ASMFC Interstate Fishery Management Plan for Atlantic menhaden; ME regulations)
Atlantic sturgeon* (ASMFC Interstate Fishery Management Plan for Atlantic sturgeon; ME regulations)
Bluefin tuna *Thunnus thynnus*
Bluefish *Pomatomus saltatrix* (ASMFC Interstate Fishery Management Plan for Bluefish; ME regulations)
Cusk *Brosme brosme* (ME regulations)
European oysters *Ostrea edulis* (ME regulations)
Green crab *Carcinas maenas* (ME statutes)
Horseshoe crab *Limulus polyphemus* (ASMFC Interstate Fishery Management Plan for Horseshoe crab; ME regulations)
Jonah crab *Cancer borealis* (ME statutes; ME regulations contemplated)
Marine worms (ME regulations)
Blood worm *Glycera dibranchiate*
Sand worm *Nereis virens*
Periwinkles *Littorina littorea*
Rock crab *Cancer irroratus* (ME statutes)
Sea cucumber *Cucumaria frondosa* (ME statutes; ME regulations)
Seaweed *Ascophyllum nodosum* (ME regulations)
Squid *Loligo pealei*
Shortnose sturgeon* *Acipenser brevirostrum* (ME regulations)
Surf clam *Spisula solidissima* (ME regulations)
Swordfish *Xiphias gladius*
Waved whelk *Buccinum undatum* (ME regulations)

*No harvest allowed
** No commercial harvest

Example of a Marine Fisheries Management Plan
Atlantic Sturgeon

Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon (July 1998)